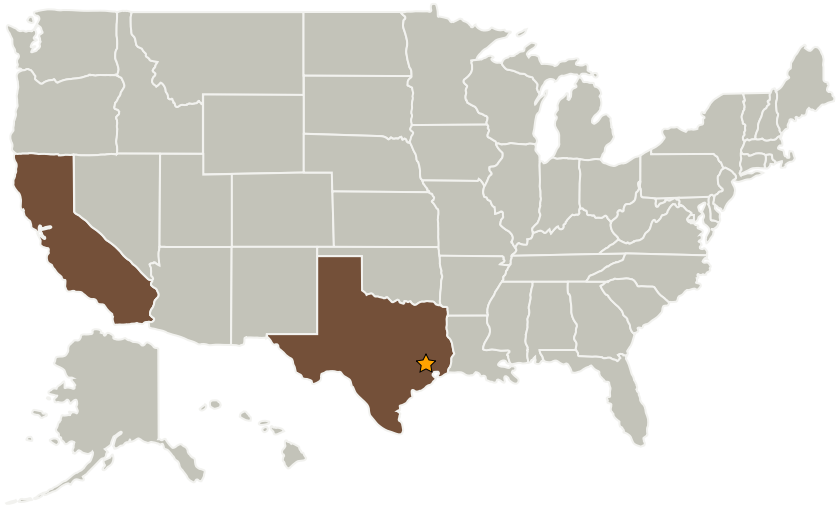
Selective Photoinitiated Electrophoretic Separator, Phase I

Completed Technology Project (2007 - 2007)

Project Introduction

To address NASA Johnson Space Center needs for gas separation and collection technology for lunar in-situ resource utilization, Physical Optics Corporation (POC) proposes to develop a new Selective Photoinitiated Electrophoretic Separator (SPIES) System, based on selective photoionization and electrophoresis. This approach incorporates a novel system design for selective photoionization for electrophoresis of selected gases, for electrophoretic processing, to meet the NASA requirement for equipment with low launch mass to separate hydrogen, carbon dioxide, nitrogen, helium, water, ammonia, and methane. The SPIES system launch weight and energy consumption will be 33% of those of the current distilling/purification systems because it eliminates the requirements for consumables and downstream distillation equipment. While requiring minimal system maintenance, this system will operate without consumables, and will be easily reconfigurable for different ISRU scenarios. In Phase I POC will establish the feasibility of the SPIES system by assembling a proof-of-concept prototype and demonstrating separation of a simulated lunar volatile, reducing development risk in Phase II. In Phase II POC plans to optimize the SPIES system design and assemble an advanced system prototype that can perform multiple gas separation tasks, enabling NASA to selectively remove and purify a range of gas streams in lunar solar resource prospecting.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Physical Optics Corporation	Supporting Organization	Industry	Torrance, California

Primary U.S. Work Locations	
California	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX07 Exploration Destination Systems
  - TX07.1 In-Situ Resource Utilization
    - TX07.1.2 Resource Acquisition, Isolation, and Preparation